Dayananda Sagar University
College of Pharmaceutical Sciences

Course Outcomes – B.Pharm

1st Sem B. Pharm

Sl No	Subject Code	Subject Name	Course Outcomes
1	17BP101 17BP107	Human Anatomy and Physiology - I	**Upon completion of this course the student should be able to –** 1. Describe the general morphology, structure, and purposes of the various human bodily organs. 2. The numerous homeostatic processes and their imbalances should be justified. 3. Describe the numerous organs and tissues that make up the body multiple systems. 4. experiments involving the neurological system, the body, and particular senses. 5. Examine the coordinated operation of the many organs within each system.
2	17BP102 17BP108	Pharmaceutical Analysis	**Upon completion of the course student shall be able to –** Integrating analytical skills 1. Predicting fundamental methodology to prepare different strength of solutions 2. Estimating the various volumetric and electrochemical titrations 3. outlining the sources of mistakes and errors. 4. Inferring the basic knowledge in the principles of electrochemical analytical techniques
3	17BP103 17BP109	Pharmaceutics-I	**Upon completion of this course the student should be able to:** 1. Illustrate the different parts of a prescription with their significance and various operational aspects in compounding and dispensing of a prescription.

			2. Critique on different pharmaceutical calculation involved in formulation and explore the rules to prepare and dispense of various types of powders 3. Elucidate the various excipients used in liquid orals and enumerate the identification, precautions on instabilities of biphasic liquids 4. Estimate the percentage of solutions by allegation method, Convert the solutions to proof spirit, find out the isotonicity of solutions 5. Designate various causes of incompatibility and their remedies with suitable example. 6. Explicate the factors influencing dermal penetration of drugs
4	17BP104 17BP110	Pharmaceutical Inorganic Chemistry	**Upon completion of course student shall be able to –** 1. Be familiar with the origins of impurities and techniques for identifying them in inorganic medicines and medications. 2. Recognize the significance of inorganic chemicals in medicine and pharmaceuticals 3. Acknowledge about the role of fluoride in dental caries and importance of maintaining dental hygiene 4. Familiarize with radiopharmaceuticals and its importance in therapy, diagnosis, treatment 5. Identifying various ions predent in the electrolyte sand their role in maintaining the physiological acid -base balance

2nd Sem B. Pharm

Sl No	Subject Code	Subject Name	Course Outcomes
1	17BP201 17BP207	Human Anatomy and	**Upon completion of this course the student should be able to –**

		Physiology - II	1. Recall the nervous system& arrangement, and list the parts of the brain structure and functions. 2. Describe the physiology of the digestive system. 3.Demonstrate respiratory volumes and explain the mechanisms underlying the urinary and respiratory systems. 4. Interpret how the endocrine system regulates hormones and their functions to manage the body general activity. 5. Describe the reproductive system physiology, the genes and chromosomes.
2	17BP202 17BP208	Pharmaceutical Organic Chemistry –I	**Upon completion of the course student shall be able to –** 1. Illustrates Examples and increases Problem solving ability of student in IUPAC Nomenclature 2. Articulates Different Hybridization patterns of Organic compounds and Determining Various Aspects of Important organic reactions like elimination and addition reaction. 3. Inferring and summarizing various mechanisms and application of Pharmaceutically important compounds. 4. Interpreting various applications of Organic reactions in the field of Pharmacy and enumerates uses of selected organic compounds. 5. Sketching several characteristic reactions, steps involved and their application in synthetic chemistry of compounds such as acids and amines
3	17BP203 17BP209	Biochemistry	**Upon completion of this course the student should be able to –** 1. Recognize the functions of enzymes in catalysis, the significance of enzyme inhibitors in the development of novel medications, and the therapeutic and diagnostic uses of enzymes. 2. Recognize how nutrient molecules are metabolised under

			normal and abnormal circumstances. 3. Recognize the roles played by DNA in the production of RNAs and proteins as well as the genetic structure of the mammalian genome. 4. Familiarize with the metabolic aspect of carbohydrate, protein, fats in detail 5. significance of metabolic diseases in body and life style disorders due to it.
4	17BP204	Pathophysiology	**Upon completion of course student shall be able to –** 1.Relate the etiology and pathogenesis of the selected disease states. 2. List signs and symptoms of the diseases. Associate the complications of the diseases. 3.Identify most commonly encountered pathophysiological state and disease mechanism as well as any clinical testing requirements. 4. State the etiology and effects of disease on the various organ systems. 5.Identify compensation mechanisms that occur in response to trauma and disease.

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3rd Sem B. Pharm

Sl No	Subject Code	Subject Name	Course Outcomes
1	17BP301 17BP305	Pharmaceutical Organic Chemistry - II	**Upon completion of the course the student shall be able to –** 1. Summarizes different mechanisms and compares the reactivity of aromatic compounds. 2. Outlining Various Aspects of Important organic reactions and Synthetic methods for few classes of organic compounds like Phenols, amines and acid. 3. Deducing various analytical constants of fats and oils. 4. Assessing various applications of Organic reactions in the field of Pharmacy and Categorize the uses of selected organic compounds which are polyaromatic. 5. Exemplifying basic concepts of Cycloalkanes.
2	17BP302 17BP306	Physical Pharmaceutics - I	**Upon the completion of the course student shall be able to –** 1. Memorize the solubility expression and laws involved in solubility along with their limitations and applications 2. Recall the states and properties of matter and apply the various physicochemical properties of drug molecules in dosage form 3. Critique the concepts of surface and interfacial surface 4. To categorize complexation and apply the role and concepts of complexation and protein binding 5. Perceive the knowledge of pH, buffers and isotonic solution, outline their role in pharmaceutical preparations
3	17BP303 17BP307	Pharmaceutical Microbiology	**Upon completion of the subject student shall be able to –** 1. Explaining methods of identification, cultivation and preservation of various microorganisms

			2. Assessing the importance and implementation of sterilization in pharmaceutical processing and industry 3. Learning sterility testing of pharmaceutical products. 4. Experimenting microbiological standardization of Pharmaceuticals. 5. Developing the cell culture technology and its applications in pharmaceutical industries.
4	17BP304 17BP308	Pharmaceutical Engineering	**Upon completion of the course student shall be able –** 1. To categorized and explain various unit operations involved in manufacturing of pharmaceuticals. 2. To relating the concepts of flow of fluids, size reduction and size separation 3. To summarize different mechanisms of heat transfer. 4. To attribute the various factors influencing mixing, filtration and centrifugation and also equipment. 5. To attribute the various preventive methods used for corrosion control in Pharmaceutical industries.

4th Sem B. Pharm

Sl No	Subject Code	Subject Name	Course Outcomes
1	17BP401	Pharmaceutical Organic Chemistry – III	**Upon completion of the course the student shall be able to –** 1. Annote isomerism and classify stereoisomerism. 2. Identify and designate various confirmations and configurations; their significance in pharm. Chemistry 3. Infer the concept of chirality, its resolution, and synthesis of stereoselective and stereospecific compounds 4. Enumerate the rules of nomenclature, and discuss the

			synthesis, aromaticity and reactivity of heterocyclic compounds. 5. Synthetic approaches and uses of some important heterocyclic drug molecules.
2	17BP402 17BP406	Medicinal Chemistry – I	**Upon the completion of the course student shall be able to –** 1. categorizing the chemistry of drugs with respect to their pharmacological activity 2. paraphrasing the drug metabolic pathways, adverse effect and therapeutic value of drugs 3. predicting the Structural Activity Relationship (SAR) of different class of drugs 4. tabulating the synthesis of some important class of drugs 5. interpreting the mechanism pathways of different class of medicinal compounds.
3	17BP403 17BP407	Physical Pharmaceutics – II	**Upon completion of the subject student shall be able to –** 1. Classification and detailed characterization of colloidal dispersions with their applications. 2. Applications of rheology in flow of liquids and deformation of solids. 3. Exemplify various theories of emulsions and suspensions with their classification and applications 4. Enumerate the fundamental and derived properties of powders and the methods to determine them. 5. Outline the principles of chemical kinetics & to use them for stability testing and determination of expiry date of formulations.
4	17BP404 17BP408	Pharmacology – I	**Upon completion of the course student shall be able –** 1. Apply the basic pharmacological knowledge in the prevention and treatment of various diseases.

			2. To correlate the basic pharmacological knowledge with different drugs 3. To Analyse the pharmacological actions of different categories of drugs 4. To highlight the mechanism of drug action at organ system/sub cellular/ macromolecular levels. 5. Observe the adverse effects, and actions of drugs and emphasize the knowledge of drugs
5	17BP405 17BP409	Pharmacognosy & Phytochemistry – I	**Upon completion of the course, the student shall be able –** 1. To examine the Quality control of crude drugs along with the classification of crude drugs. 2. To implement the conservation of tropical medicinal plants along with the cultivation of medicinal plants 3. To summarize plant tissue culture and its applications 4. To identify the secondary metabolites and their uses along with traditional systems of medicine **5.** To compare the chemical nature and uses of primary metabolites, fibres,Hallucinogens, and allergens from natural origin

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5th Sem B. Pharm

Sl No	Subject Code	Subject Name	Course Outcomes
1	17BP501	Medicinal Chemistry II	**Upon completion of the course the student shall be able to –** 1. To classify and correlate the chemistry of drugs with respect to their pharmacological activity. 2. Well familiar with the creation of some important class of drugs with medicinal use. 3. A comprehensive understanding of mechanisms of action of the drug, structure-activity relationships (SAR). 4. To associate the chemical structure of the drug with biological activity. 5. To study the adverse effect and therapeutic value of drugs.
2	17BP502 17BP506	Formulative Pharmacy	**Upon completion of the course the student shall be able to –** 1. Outline the importance of pre-formulation in development of pharmaceutical dosage forms and illustrate the stability studies on different dosage forms 2. Annotate the formulation, formulation requirement, manufacturing techniques and evaluation of tablets and liquids. 3. Analyse the role of Capsules and Pellets in Pharmaceutical industry 4. Estimate the importance of formulation requirement, method of preparation and sterility of sterile dosage form. 5. Recapitulate the formulation, method of preparation and evaluation of cosmetics, Pharmaceutical Aerosols

			and summarize the use of packaging materials.
3	17BP503 17BP507	Pharmacology – II	**Upon completion of the course the student shall be able to –** 1. To explore the mechanism of drug action and its relevance in the treatment of different heart diseases 2. To correlate pharmacology with related blood concerned diseases. 3. To value the relation between different class of drugs, their actions and comparisons. 4. To recognize the actions, adverse effects and applications of different drugs. 5. To assess the bioassay of different chemicals and their applications.
4	17BP504 17BP508	Pharmacognosy and Phytochemistry-II	**Upon completion of the course, the student shall be able** 1. To attribute the modern extraction techniques, characterization and identification of the herbal drugs and phytoconstituents 2. To structure the preparation and development of herbal formulation. 3. To review the herbal drug interactions 4. To organise the isolation and identification of phytoconstituents. 5. To assess the isolation and identification of phytoconstituents.
5	17BP505	Pharmaceutical Jurisprudence	**Upon completion of the course, the student shall be able to understand –** 1. Practice the Professional ethics; 2. Retrieve the various concepts of the pharmaceutical legislation in India; 3. Estimate the various parameters in the Drug and Cosmetic Act and rules; 4. Summarize the Drug policy, DPCO, Patent and design act;

			5. Choose the labelling requirements and packaging guidelines for drugs and cosmetics; 6. Gather the concepts of Dangerous Drugs Act, Pharmacy Act and Excise duties Act; and 7. Interpret other laws as prescribed by the Pharmacy Council of India from time to time including International Laws.

6th Sem B. Pharm

Sl No	Subject Code	Subject Name	Course Outcomes
1	17BP601 17BP607	MEDICINAL CHEMISTRY III – THEORY	**Upon completion of the course the student shall be able to –** 1. To synthesize and associate the chemistry of drugs with respect to their biological activity. 2. To recognize the metabolism, adverse effects and therapeutic value of drugs. 3. To make out the importance of SAR of drugs and correlating with biological activity of the drug. 4. To be well familiar with Quantitative structure-activity relationship (QSAR), Molecular modeling, Virtual screening & docking. 5. Emphasis on combinatorial library design and computer aided drug design (CADD).
2	17BP602 17BP608	PHARMACOLOGY III–THEORY	**Upon completion of the course the student shall be able to –** 1. To value the drugs & basic pharmacology and their therapeutic applications. 2. To observe the fundamentals of toxicology and

			to treat various poisonings. 3. To Considerate toxicological principles and to handle different poisonings 4. To Explore the relation between pharmacology and other medical sciences and to understand the risk profile of each medicine. 5. Emphasizing the knowledge in the field of pharmacology pertaining on the drugs and its therapeutic applications on human.
3	17BP603 17BP609	HERBAL DRUGTECHNOLOGY– THEORY	**Upon completion of the course the student shall be able to –** 1. To identify the raw materials as a source of herbal drug from cultivation to herbal drug formulation including different systems of Indian medicine. 2. Analyse the health benefits of plants as nutraceuticals and elaborate on the herb-food and herb-drug interactions. 3. Categorize the various excipients for preparation of cosmetics from herbal origin and novel dosage forms. 4. Implementation of WHO and ICH guidelines for evaluation of herbal drugs and outline the patenting of herbal drugs. 5. Explain present status and prospects of herbal drug-based industry and components of Good Manufacturing Practice for Indian systems of medicine.
4	17BP604	BIOPHARMACEUTICS AND PHARMACOKINETICS –THEORY	**Upon completion of the course, the student shall be able to-** 1. To summarizing the mechanisms, interpret various factors affecting drug absorption, distribution. 2. Use of plasma drug concentration-time data to calculate the pharmacokinetic parameters to describe the kinetics of drug metabolism, excretion, elimination. 3. To determining the pharmacokinetic models for the pharmacokinetic parameters and one compartment model. 4. To correlating the calculation of loading and maintenance doses. And also two compartment model 5. To choosing factors causing Non-linearity

5	17BP605	PHARMACEUTICAL BIOTECHNOLOGY–THEORY	**Upon completion of the course, the student shall be able to –** 1. To summarize the importance of Immobilized enzymes in Pharmaceutical Industries 2. To link genetic engineering applications in relation to the production of pharmaceuticals 3. To review the hybridoma technique to produce monoclonal antibodies & to summarize immunity, bacterial and viral vaccines blood and plasma substitute 4. To review Immunoblotting techniques, biotransformation, mutation, and genetic transfer in bacteria 5. To experiment with the use of microorganisms in fermentation technology
6	17BP606	QUALITYASSURANCE –THEORY	**Upon completion of the course, the student shall be able to –** 1. Demonstrate the concepts of quality assurance and total quality management. 2. Critique the importance of documentation 3. Illustrate the design, construction and layout of pharmaceutical Industries 4. Outline the role and responsibilities of quality assurance and quality control departments 5. Analyse the validation of various instruments.

7th Sem B. Pharm

Sl No	Subject Code	Subject Name	Course Outcomes
1	17BP701 17BP705	INSTRUMENTAL METHODS OF ANALYSIS – THEORY	**Upon completion of the course the student shall be able to –** 1. Enumerate the principles and applications of various spectroscopic techniques like UV, IR, Fluorimeter, flame

			photometer, atomic absorption spectroscopy, nephloturbidometery. 2. Illucidate instrumentation and working of the above spectrophotometers 3. Describe various chromatography techniques and its type like adsorption, partition, TL, PC, HPLC, GC, Electrophoresis etc. along with their applications 4. Discuss the concept of absorption, ion exchange, gel and affinity chromatography 5. Perform Quantitative and qualitative analysis of the compounds using these techniques
2	17BP702	INDUSTRIAL PHARMACY– THEORY	**Upon completion of the course the student shall be able to –** 1. Demonstrate the general considerations and the operational steps of pilot plant scale up techniques 2. Explain the different laws and acts that regulate pharmaceutical industry 3. Recognize the steps involved in technology transfer from R&D to production. 4. Illustrate the common measures use in quality 5. Categorize the general requirements for submission of application for issue of Certificate of Pharmaceutical Product (COPP).
3	17BP703	PHARMACY PRACTICE – THEORY	**Upon completion of the course the student shall be able to –** 1. Categorize and choose various drug distribution methods in a hospital 2. Preparing for the pharmacy stores management and inventory control 3. Monitor drug therapy of patient through medication chart review and clinical review 4. Obtain & interpret the medication history interview and present the counseling to the patients 5. Expressing drug-related problems & assessing the adverse drug reactions 6. Associating selected laboratory results (as monitoring parameters in therapeutics) for specific disease states 7. Building the pharmaceutical care services by promoting the concept of rational drug therapy
4	17BP704	NOVEL DRUG DELIVERY SYSTEM–	**Upon completion of the course, the student shall be able** 1. Demonstrate various approaches for development of novel drug delivery systems.

		THEORY	2. Analyse the criteria for selection of drugs and polymers for developing novel drug delivery systems. 3. Illustrate the basic components of transdermal and mucosal drug delivery systems. 4. Outline the various carriers used for drug targeting. 5. Elaborate the development and applications of intrauterine drug delivery systems.

8th Sem B. Pharm

Sl No	Subject Code	Subject Name	Course Outcomes
1	17BP801	BIOSTATISTICS ANDRESEARCH METHODOLOGY	**Upon completion of the course the student shall be able to –** 1. Know the various statistical methods to solve different types of problems 2. Operate various statistical software packages 3. Understand the importance of Computer in hospital and Community Pharmacy 4. Appreciate the statistical technique in solving the pharmaceutical problems
2	17BP802	SOCIAL AND PREVENTIVE PHARMACY	**Upon completion of the course the student shall be able to –** 1. Present alternative ways of solving problems related to health 2. Ability to apply general principles of prevention and control of disease. 3. Highlight the objective, functioning and outcomes of national health programs 4. Summarize the principles of National Health Intervention programs

			5. Ability to provide community services in rural, urban and school health.
3	17BP803	PHARMACEUTICAL MARKETING	**Upon completion of the course the student shall be able to –** 1. Basic concepts and scope of marketing, analysing consumer and industrial buying behaviours. 2. Analyse the qualitative, quantitative, size, composition, demographic descriptions, sociopsychological characteristics of consumer. Motivation and prescribing habits of physician, patient's choice of physician. 3. Enumerate the various aspects of product decision, product life cycle and product management in pharmaceutical industry. 4. Emphasize on Pharmaceutical marketing strategies and roles and duties of professional sales representatives 5. Explicate various pricing strategies and emerging concepts in vertical, horizontal, rural and global marketing.
4	17BP804	PHARMACEUTICAL REGULATORY SCIENCE	**Upon completion of the course, the student shall be able** 1. Illustrate about the process of drug discovery and development 2. Enumerate the regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals 3. Outline the regulatory approval process and their registration in Indian and international markets

5	17BP805	PHARMACOVIGILANCE	**Upon completion of the course, the student shall be able to understand –** 1. Detection of new adverse drug reactions and their assessment. 2. Illustrate international standards for classification of diseases and drugs. 3. Manage Adverse drug reaction reporting systems and communication in pharmacovigilance
	17BP806	QUALITY CONTROL AND STANDARDIZATIONS OF HERBALS	**Upon completion of the course, the student shall be able to understand –** 1. To memorize WHO guidelines for quality control of herbal drugs 2. To implement cGMP, GAP, GACP, GMP, and GLP in the traditional system of medicine. 3. To summarize EU and ICH guidelines for quality control of herbal drugs and to summarize Research Guidelines for Evaluating the Safety and Efficacy of Herbal Medicines 4. To determine Stability testing of herbal medicines & various chromatographic techniques for standardization of herbal drugs & to gather documents for NDA along with GMP requirements and Drugs & Cosmetics Act provisions. 5. To execute the regulatory approval process and their registration in Indian and international markets.
	17BP807	COMPUTER AIDED DRUG DESIGN	**Upon completion of the course, the student shall be able to understand –** 1. Describe drug discovery, and various approaches used for it. 2. Define lead, lead discovery and lead optimization including bioisosterism. 3. Illustrate QSAR- its approaches and its types (2D, 3D, CoMFA, CoMSIA)

			4. Define the concept of virtual screening, its types (SBDD &LBDD), pharmacophore based drug designing their advantages and limitations. Importance of molecular mechanics and quantum mechanics in molecular modelling. **5.** Discuss the fields of Bioinformatics and Cheminformatics
	17BP808	CELL AND MOLECULAR BIOLOGY	**Upon completion of the course, the student shall be able to understand –** 1. Explain cell and molecular biology history. 2. Understand cellular functioning and composition. 3. Describe the chemical foundations of cell biology. 4. Summarize the DNA properties of cell biology. 5. Estimate protein structure and function. 6. Explore cellular membrane structure and function. 7. Describe basic molecular genetic mechanisms and summarize the Cell Cycle
	17BP809	COSMETIC SCIENCE	**Upon completion of the course, the student shall be able to understand –** 1. Memorize the definition of cosmetics according to regulatory bodies, recall the evolution of cosmetics and cosmetic excipients and remember the basic structure of skin and hair and problems associated with oral cavity 2. Annotate the basic principles of formulation requirement and building blocks of hair care, skin care and oral care products 3. Elaborate the importance of SPF, infer the role of herbs in cosmetics and describe the analytical techniques of cosmetics 4. Examine cosmetic preparation for skin and hair using different analytical methods 5. Outline the problems associated with hair, scalp and skin.

	17BP810	EXPERIMENTAL PHARMACOLOGY	**Upon completion of the course, the student shall be able to understand –** 1. To value the applications of various commonly used laboratory animals. 2. To Analyse the various screening methods used in preclinical research. 3. To Assess the importance of biostatistics and research methodology. 4. Design and execute a research hypothesis independently 5. Highlight the screening methods of each ailment.
	17BP811	ADVANCED INSTRUMENTATION TECHNIQUES	**Upon completion of the course, the student shall be able to understand –** 1. Interpret and elucidate the structure of organic compounds using NMR and Mass spectrometry. 2. Apply the concepts of X ray diffraction and thermal analysis techniques. 3. Calibrate and validate the instruments as per the ICH guidelines. 4. Discuss the principle and procedure involved in the solid and liquid phase extraction. **5.** Describe the importance of Hyphenated techniques.
	17BP812	DIETARY SUPPLEMENTS AND NEUTRACEUTICALS	**Upon completion of the course, the student shall be able to understand –** 1. To review the need of supplements by the different group of people to maintain healthy life. 2. To validate the outcome of deficiencies in dietary supplements. 3. To assess the factors that influence the health issues. 4. To appreciate the components in dietary supplements and the application. 5. To structure the regulatory and commercial aspects of dietary supplements including health claims.

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